AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A method of ~~enhancing characteristic properties of a semiconductor, the method comprising annealing a base material at a temperature of 475° C or less to form the semiconductor.~~ determining optimal annealing conditions for a semiconductor material comprising:

obtaining a first set of values indicative of resistivity of the material for a plurality of annealing temperatures;

obtaining a second set of values indicative of carrier lifetime of the material for a plurality of annealing temperatures; and

comparing the first and second set of values to determine an annealing temperature or a range of annealing temperatures where the carrier lifetime and the resistivity of the material are optimized.

2. (Currently Amended) The method of claim 1, ~~wherein the characteristic properties enhanced includes carrier lifetime and resistivity~~ further comprising:

determining an optimum annealing duration for the material.

3. (Currently Amended) ~~A method of producing a semiconductor material with photoconductive properties, the method comprising annealing the base material at a temperature of 475° C or less so as to enhance the carrier lifetime of the material and the resistivity of the material for use as a photoconductor~~ The method of claim 2, wherein the material contains As, and the optimum annealing duration is determined by obtaining a third set of values indicative of arsenic concentration of the material for a plurality of annealing durations and for at least one annealing temperature;

comparing the at least one third set of values with the first and second sets of values to determine an annealing duration and an annealing temperature which together optimize the carrier lifetime and the resistivity of the material.

4. (Currently Amended) ~~The method any preceding claim, wherein the annealing occurs at a temperature in the range of 250°C and 450°C~~ A method of enhancing characteristic properties of a semiconductor, the method comprising annealing a base material at a temperature of 475°C or less to form the semiconductor, the temperature being determined according to the method of claim 1.

5. (Currently Amended) The method of ~~any preceding claim, wherein the base material is grown using molecular beam epitaxy~~ claim 4, wherein the characteristic properties enhanced includes carrier lifetime and resistivity.

6. (Currently Amended) ~~The~~ A method ~~according to any one of claims I to 4, wherein the base material is produced using As ion implantation~~ of producing a semiconductor material with photoconductive properties, the method comprising annealing the base material at a temperature of 475°C or less so as to enhance the carrier lifetime of the material and the restivity of the material for use as a photoconductor, the temperature being determined according to the method of claim 1.

7. (Currently Amended) The method ~~according to any preceding claim, wherein the base material is formed in a growth chamber and annealing occurs outside the growth chamber~~ of claim 4, wherein the annealing occurs at a temperature in the range of 250°C and 450°C.

8. (Currently Amended) The method ~~according to any preceding claim, wherein the semiconductor is a Group III-V semiconductor with photoconductive properties~~ of claim 4, wherein the base material is grown using molecular beam epitaxy.

9. (Currently Amended) The method ~~according to any preceding claim, wherein the semiconductor comprises As~~ according to claim 4, wherein the base material is produced using As ion implantation.

10. (Currently Amended) The method ~~according to any preceding claim~~ according to claim 4, wherein the base material is ~~GaAs~~ formed in a growth chamber and annealing occurs outside the growth chamber.

11. (Currently Amended) The method according to claim ~~10~~ 4, ~~wherein the GaAs is grown in a molecular beam epitaxy reactor at a temperature in the range of approximately 200 C to 300 C~~ wherein the semiconductor is a Group III-V semiconductor with photoconductive properties.

12. The method according to ~~any one of claims 1 to 9~~ claim 4, wherein the ~~base material is InGaAs~~ semiconductor comprises As.

13. (Currently Amended) The method ~~of claim 12~~ according to claim 4, wherein the base material is ~~annealed at a temperature in the range from 350 C to 450 C~~ GaAs.

14. (Currently Amended) The method according to ~~any preceding~~ claim 13, wherein the ~~annealing is performed for fifteen minutes or less~~ wherein the GaAs is grown in a molecular beam epitaxy reactor at a temperature in the range of approximately 200°C to 300°C.

15. (Currently Amended) ~~A semiconductor material formed using the method according to any preceding claim~~ The method according to claim 4, wherein the base material is InGaAs.

16. (Currently Amended) ~~A photoconductive element comprising InGaAs, said InGaAs having a carrier lifetime of at most 1 ps~~ The method of claim 15, wherein the base material is annealed at a temperature in the range of 350°C to 450°C.

17. (Currently Amended) ~~A photoconductive emitter comprising the semiconductor material of claim 15~~ The method according to claim 4, wherein the annealing is performed for fifteen minutes or less.

18. (Currently Amended) ~~The emitter of claim 17, wherein the emitter is configured to emit terahertz radiation~~ A semiconductor material formed using the method of claim 1.

19. (Currently Amended) A photoconductive ~~receiver~~ element comprising ~~the semiconductor material of claim 15~~ InGaAs, said InGaAs having a carrier lifetime of at most 1ps.

20. (Currently Amended) ~~The receiver of claim 19, wherein the receiver is configured to receiver terahertz radiation~~ A photoconductive emitter comprising the semiconductor material of claim 18.

21. (Currently Amended) ~~A photoconductive antenna comprising a photoconducting substrate and two electrodes provided on the surface of said photoconducting substrate, said photoconducting substrate comprising InGaAs having a carrier lifetime of less than 1 ps~~ The emitter of claim 16, wherein the emitter is configured to emit terahertz radiation formed using a method according to claim 1.

22. (Currently Amended) ~~A method of determining optimal annealing conditions for a semiconductor material comprising: obtaining a first set of values indicative of resistivity of the material for a plurality of annealing temperatures; obtaining a second set of values indicative of carrier lifetime of the material for a plurality of annealing temperatures; and comparing the first and second sets of values to determine an annealing temperature or a range of annealing temperatures where the carrier lifetime and the resistivity of the material are optimized~~ A photoconductive receiver comprising the semiconductor material of claim 18.

23. (Currently Amended) The ~~method~~ receiver of claim 22, ~~further comprising: determining an optimum annealing duration for the material~~ wherein the receiver is configured to receive terahertz radiation.

24. (Currently Amended) ~~The method of claim 23, wherein the material contains As, and the optimum annealing duration is determined by obtaining a third set of values indicative of arsenic concentration of the material for a plurality of annealing durations and~~

~~for at least one annealing temperature; comparing the at least one third set of values with the first and second sets of values to determine an annealing duration and an annealing temperature which together optimize the carrier lifetime and the resistivity of the material~~ A photoconductive antenna comprising a photoconducting substrate and two electrodes provided on the surface of said photoconducting substrate, said photoconducting substrate comprising InGaAs having a carrier lifetime of less than 1 ps.

25. (Original) An investigative system comprising:

a laser configured to emit a pump beam having a wavelength in the range from 1.3 and 1.55 μm,

an emitter configured to emit emitted radiation in response to irradiation by said pump beam; and

a detector for detecting said emitted radiation,

wherein either or both of the emitter or detector comprise InGaAs.

Claims 26-29. (Canceled)